WHAT IS CLAIMED IS:

1. A rolling die for a ball screw, comprising:

a cylindrical portion including a helical protrusion formed in an outer peripheral surface thereof for forming a helical ball groove in a raw material of a screw shaft of the ball screw; and

a conical lead-in portion formed in one end portion of the cylindrical portion, the lead-in portion including a plurality of frustum-cone-shaped portions,

wherein the contact angles of the frustum-cone-shaped portions with respect to the raw material of the screw shaft are each set so as to increase sequentially in the order starting at and from the frustum-cone-shaped portion adjoining the cylindrical portion.

2. The rolling die for a ball screw as set forth in claim 1, wherein the lead-in portion includes a first frustum-cone-shaped portion adjoining the cylindrical portion and a second frustum-cone-shaped portion adjoining the first frustum-cone-shaped portion.

3. The rolling die for a ball screw as set forth in claim 2, wherein a contact angle of the first frustum-cone-shaped portion is set at an angle of 0.4°, and a contact angle of the

second frustum-cone-shaped portion is set at an angle of 4°.

4. The rolling die for a ball screw as set forth in claim 2, a run-off portion is formed in the other end portion of the cylindrical portion, a contact angle of the run-off portion is set not more than the contact angle of the first frustum-cone-shaped portion.

5. The rolling die for a ball screw as set forth in claim 2, wherein an axial-direction length L of the first frustum-cone-shaped portion is set in the range of $\kappa \leq L \leq 10\kappa$, where κ expresses the moving amount of the raw material of the screw shaft per 1/2 rotation.